

THE MISSOURI RIVER AS A FAUNAL BARRIER.

BY PAUL BARTSCH.

Several years ago I published a note in "Science" on this topic. It seems that this has not come to the attention of most of the workers who are dealing with fresh-water pearly mussels, and I therefore deem it wise to again call attention to it.

In our work during the Mississippi Valley Pearl Mussel Inquiry, we found that the enormous amount of sediment carried by the Missouri River formed an effectual barrier to the distribution of the *Unionidae*. There, while the Mississippi and its tributaries to the north of the Missouri River teemed with aquatic life, careful search in the Mississippi below the mouth of the Missouri, and the mouth of the Ohio, did not reveal a single living *Unionid*. Dead specimens were also absent on the sand bars south of St. Louis. The heavy load of mud carried by the waters of the Missouri, yielding $\frac{3}{4}$ inches of sediment in a three-inch tube, probably strangles these and other organisms.

We have, therefore, the curious condition of a river forming a barrier to aquatic animals.

SHELL COLLECTING IN THE SIERRA NEVADAS.

BY HERBERT N. LOWE.

To see the Yosemite and the groves of Giant Sequoias had been a dream long cherished during my thirty years residence in California. Some dreams come true; and this summer my mother and I drove there, with our "Buick Six" well stocked with camp outfit.

The early part of September is rather a dry and unpropitious time for collecting mollusks in the mountains. Rock piles and moist meadows were the most favorable stations. These lovely Sierra meadows, filled with brilliant wild-flowers and surrounded by noble forests of pine, cedar and fir, are the most charming spots imaginable. One vainly hunts for words to give an idea of the wonderful scenery of the Sierra Nevadas. Each day was simply perfect, with clear warm sunshine and air sweet

with odors of pine and fir ; an experience never to be forgotten by the lover of nature.

Leaving the State Highway at Madera, we struck off through the foothills on the Yosemite Road. About five miles west of Raymond I made my first find of *Epiphragmophora tudiculata* var. *cypreophila* in rock piles near the road. By the amount of effort it takes to find these it seems to be rather a rare species.

At the old mining camp of "Coarse Gold" we stopped for lunch and a few *Physa diaphana* Tryon were found in the nearby stream. Our stop for the night was at "Fish Camp," a most beautiful spot, situated in one of the many Sierra meadows, and headquarters for a large logging camp near by. A diligent search was unrewarded by any molluscan species whatever. However at Wawona, our next stop, I had better luck.

About half a mile south of the hotel is a small springy meadow on a gently sloping hillside. Here under sticks were five live *Vertigo ovata* Say ; *Succinea stretchiana* Bld. and *Pisidium*, all "side by each ;" a few of the very rare *Vitrea* or *Euconulus chersinella* Dall were also found here with *Euconulus fulvus* var. *alaskensis* Pils. A search of the upper end of the north meadow resulted in some fine large *Polygyra loricata* Gld. and *Vitrina alaskana* Dall, also a single specimen each of *Vertigo modesta* var. *castanea* Sterki and *Striatura milium* var. *meridionalis* P. & F.

While in the Yosemite, a hike was taken to Vernal Falls, and on exploring rock slides near there a few specimens of *Epi. tudiculata* var. *tularensis* Hemp. were found in company with a flattened form of *Epi. hillebrandi* which Dr. Pilsbry considers new. In the thick moss near the Falls a few *Vitrina alaskana* Dall had their happy homes. In a small meadow about twenty miles from Yosemite on the Big Oak Flat Road, some fine *Pyramidula cronkheiti* Newc. were living under small logs in company with two *Pisidium* and a *Sphacrium*.

After our two delightful days at Wawona and the Mariposa Grove of giant Sequoias, and four more in the Yosemite, we took the Big Oak Flat Road out of the Valley as far as Crockers, where the Tioga road leads over the pass into the Mono Lake country and Western Nevada. One crosses the pass at an

elevation of ten thousand feet where the snows never melt, and only a half mile from the road is a real live glacier. From the sudden change in scenery on the easterly side of the Sierras one might fancy he was in the Swiss Alps. Mono Lake, over ten miles across, with two volcanic islands in its center, is fair to look upon; but the bitter waters are so charged with alkali that no living creature can exist in it. Surrounded as it is by snow-capped mountains, whose melting snows pour in on all sides, its waters remain absolutely undrinkable. From Lake Mono one travels through sand and sage brush to the lovely pine-forested shores of Lake Tahoe. Here we struck the fine Lincoln Highway leading to San Francisco. We crossed several times the old emigrant trail. One pictured the days of the hardy pioneers of the gold rush of '49, the long trains of oxen toiling up these terrible mountain trails, and contrast the ease of our modern automobile transportation over good roads and comparatively easy grades.

A stop was made by a spring on the Lincoln Highway about twenty-three miles east of Placerville. The *Epi. mormonum* var. *cala* Pils. was found here. Under boards and sticks were *Polygyra columbiana*, *Goniobasis nigrina* (the most southerly locality reported) and a form of *Polygyra loricata*. This makes the third instance on this trip where I noted land and fresh-water species living side by side. On the return south from San Francisco we stopped at Old Monterey to collect a few *Epi. californiensis* in the sand-hills at Point Pinos and *Epi. dupetithouarsi* at Cypress Point. The latter species seems to be getting quite scarce owing to the attentions of the squirrels and the cleaning-up of Cypress Point for picnic parties. All logs and sticks carefully burned up leaves no place for Madam Snail to rear her family. However, after diligent search some very fine specimens of this handsome species were added to my plunder.

For convenient reference a list follows of the species found on this trip.

Epiphragmophora tudiculata cypreophila Newc. Rock piles five miles west of Raymond.

E. tudiculata tularensis Hemp. Rock slides near Vernal Falls.

E. hillebrandi yosemitensis, new subspecies. Rock slides near Vernal Falls.

Darker in color than typical *hillebrandi*; more depressed in form, and with a much wider umbilicus. The three specimens found measure as follows :

Altitude 11	diameter 26	mm.
" 10.2	" 23.5	"
" 10	" 25	"

E. mormonum cala Pils. Near Spring on Lincoln Highway.

Polygyra columbiana Lea. Near Spring on Lincoln Highway.

Polygyra loricata Gld. New variety? on Lincoln Highway.

Polygyra loricata Gld. (typical). Under sticks on edge of Wawona Forest.

Succinea stretchiana Bld. Wawona meadow.

Vertigo ovata Say. Wawona meadow.

Vertigo modesta castanea Sterki. Wawona meadow.

Striatura milium meridionalis Pils. and Ferriss. Edge of Wawona Forest.

Zonitoides arborea Say. Meadow south of Wawona, also Big Oak Flat Road.

Pyramidula cronkhitei Newc. Edge of Wawona Forest ; also Big Oak Flat Road.

Euconulus fulvus alaskensis Pils. Edge of Wawona Forest.

Vitrea chersinella Dall. Meadow south of Wawona.

Vitrina alaskana Dall. Big Oak Flat Road and Moss near Vernal Falls.

Physa diaphana Tryon. Stream at "Coarse Gold."

Planorbis umbilicatellus Ckll. Big Oak Flat Road.

Goniobasis nigrina Lea. Spring on Placerville Road.

Pisidium abditum Hald. Big Oak Flat Road.

Pisidium occidentale Newc. Big Oak Flat Road.

Sphaerium occidentale Prime. Big Oak Flat Road.

NOTES.

PLANORBIS DILATATUS AND P. SAMPSONI. Besides its greater size, *P. sampsoni* differs from typical *dilatatus* by its very much more widely open umbilicus. The two species seem to be fairly distinct. Various forms which in collections are often referred